

What is claimed is:

1. Apparatus for depolarizing light comprising:

a beam splitter having an input and two outputs, where a light beam from a first output has a polarization that is orthogonal to a polarization of a light beam from a second output; and

a beam combiner having a first input coupled to the first output of the beam splitter via a first fiber, a second input coupled to the second output of the beam splitter via a second fiber, and an output that produces depolarized light, where the first and second fibers are polarization maintaining fibers and the second fiber has a length that provides a predefined delay with respect to the first fiber such that an interference signal having a delay equal to the predefined delay will be suppressed during a demodulation process.

2. The apparatus of claim 1 further comprising a light source coupled to the beam splitter.

3. The apparatus of claim 2 further comprising a polarization controller, coupled between the light source and the input of the beam splitter, for equalizing signal power levels at the first and second outputs of the beam splitter.

4. The apparatus of claim 1 further comprising a light source, coupled to the beam splitter, having a coherence length that is less than a length of an interrogation pulse that is formed using the depolarized light.

5. The apparatus of claim 4 further comprising a polarization controller, coupled to the input of the beam splitter, for equalizing signal power levels at the first and second outputs of the beam splitter.

6. The apparatus of claim 1 further comprising a light source, coupled to the beam

splitter, having a frequency swept output and the predefined delay is selected to ensure that a cross-correlation between orthogonal polarizations of the source do not appear in extracted signal frequencies within a receiver.

7. The apparatus of claim 6 further comprising a polarization controller, coupled to the input of the beam splitter, for equalizing signal power levels at the first and second outputs of the beam splitter.

8. Apparatus for depolarizing light comprising:

means for splitting a light beam having an input and two outputs, where a light beam from a first output has a polarization that is orthogonal to a polarization of a light beam from a second output; and

means for combining two light beams having a first input coupled to the first output of the beam splitter via a first fiber, a second input coupled to the second output of the beam splitter via a second fiber, and an output that produces depolarized light, where the first and second fibers are polarization maintaining fibers and the second fiber comprises a means for providing a predefined delay with respect to the first fiber such that an interference signal having a delay equal to the predefined delay will be suppressed during a demodulation process.

9. The apparatus of claim 8 further comprising a light source coupled to the beam splitter.

10. The apparatus of claim 8 further comprising means for controlling polarization, coupled to the input of the beam splitting means, where the polarization controlling means equalizes signal power levels at the first and second outputs of the beam splitter.

11. The apparatus of claim 8 further comprising a light source, coupled to the beam splitting means, having a coherence length that is less than a length of an interrogation pulse that is formed using the depolarized light.

12. The apparatus of claim 11 further comprising means for controlling polarization, coupled to the input of the beam splitter, where the polarization controlling means equalizes signal power levels at the first and second outputs of the beam splitter.

13. The apparatus of claim 8 further comprising a light source, coupled to the beam splitting means, having a frequency swept output and the predefined delay is selected to ensure that a cross-correlation between orthogonal polarizations of the source do not appear in extracted signal frequencies within a receiver.

14. The apparatus of claim 13 further comprising means for controlling polarization, coupled to the input of the beam splitter, where the polarization controlling means equalizes signal power levels at the first and second outputs of the beam splitter.

15. A method of forming depolarized light comprising:

splitting a light beam into two orthogonal components;

delaying a first orthogonal component with respect to a second orthogonal component using a predefined delay, while maintaining a polarization of the first orthogonal component and a polarization of the second orthogonal component; and

combining the delayed first orthogonal component with the second orthogonal component to produce a depolarized output light beam, where said predefined delay is selected to cause an interference signal having a delay equal to the predefined delay to be suppressed during a demodulation process.

16. The method of claim 15 further comprising controlling a polarization of the light beam to equalize the signal power levels of the two orthogonal components.